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Comparative analysis of tobacco smoking intensity among young and middle-aged women of one administrative district of Tyumen in 1996-2016

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Aim. To study the changes of tobacco smoking intensity among young and middle-aged women of one administrative district of Tyumen in 1996-2016.

Material and methods. Cross-sectional epidemiological studies were conducted on representative samples of women aged 25-64 years in 1996 and 2016. The category of smokers was ranked by age group and depending on the number of cigarettes smoked per day. The analysis included women of two categories — young age (25-44 years old) and middle age (45-64 years old). Women were considered high-intensity smokers if they smoked >10 cigarettes per day. According to this parameter, all smokers were divided into those with low and high smoking intensity.

Results. According to the results, a negative 20-year dynamics was revealed — an increase in the tobacco smoking intensity in the population due to the category of young women. In young women over a 20-year period with a stable prevalence of tobacco smoking, a redistribution from low to high intensity of tobacco smoking was established — the prevalence of high-intensity smokers over low-intensity ones in 2016 with inverse proportions at the first screening. In middle-aged women, over a 20-year period, with a tendency towards an increase in tobacco smoking prevalence from the first to the second screening, the prevalence of low-intensity smokers over high-intensity smokers remains.

Conclusion. Within the large-scale federal programs, it is necessary to direct efforts to reduce the intensity of tobacco smoking among women in middle-urbanized Siberian cities, focusing mainly on the category of young age.

Keywords: tobacco smoking intensity, comparative analysis, women, young age, middle age.

Relationships and Activities: none.

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Introduction

Tobacco smoking is one of the most important modifiable risk factors (RF) for the development of cardiovascular diseases (CVD). According to a systematic review, tobacco smoking among people with CVD is associated with a reduced risk of overall death [1]. In the Russian population, according to G. Ya. Maslennikova and R. G. Oganov, the loss of life expectancy at working age among women caused by tobacco smoking amounted to 5,6 years in total, and due to premature death from CVD — 9 years [2].

An increase in the prevalence of tobacco smoking among women was noted in the second half of the 20th century in most countries of Western Europe. Tobacco smoking among women then spread widely to Latin America, Japan, South and Central Europe [3]. The creation and promotion of women's tobacco brands began in the United States even earlier, in the mid-1920s, when advertising formed an association of the image of a smoking woman with the world of glamor and a symbol of women's freedom [4]. In the Russian Federation (RF), tobacco smoking among women has historically been significantly less prevalent than in most European countries; however, over the 20-year period of monitoring the Russian population among women, there has been a steady increase in smoking prevalence on the background of an increase in its intensity [5]. In addition, according to the data obtained on the Russian sample, at the end of the last century women who lived in cities smoked more often, while in the current century the frequency of this RF no longer depends on the urbanization of the population [5, 6].

The experience of many countries has shown that in order to reduce the frequency of smoking and achieve effective results in the prevention of noncommunicable diseases in specific conditions, it is necessary not only to state policy aimed at reducing the prevalence and intensity of tobacco smoking, but also to take into account the results of scientific research on the real situation of tobacco smoking in each region [7, 8]. At the same time, there is insufficient scientific data on the dynamics of tobacco smoking intensity in Russia, especially among women, although such studies can demonstrate the real response of the population to

Table 1

The structure of the examined Tyumen population of women at screenings in 1996 and 2016 by age and prevalence of tobacco smoking

Age groups (years)	I screening, number of subjects	I screening, number of smokers		II screening, number of subjects	II screening, number of smokers		p-differences between smokers at I and II screenings
		abs.	%		abs.	%	
25-44	400	136	34,0*	329	120	36,5*	p=0,4862
45-64	413	50	12,1	374	87	23,3	p=0,0000
25-64	813	186	22,9	703	207	29,4	p=0,0036
SI	813	186	23,1	703	207	31,2	p=0,0036

Note: an asterisk (*) denotes statistically significant differences between the indicator in the groups of 25-34 and 45-54 years old (I screening — p=0,0000; II screening — p=0,0001).

measures taken by the state to combat this RF of CVD and other non-communicable diseases [5, 9].

The aim is to determine the dynamics of the tobacco smoking intensity among young and middle-aged women in one of the administrative districts of Tyumen in 1996-2016.

Material and methods

On an open (unorganized) population of women in the Central Administrative District (CAD) of Tyumen, two cross-sectional studies were conducted according to a single protocol — a baseline study (1996) and repeated cardiac screening (2016). Representative samples, stratified by sex and age, were formed in a computer version using the method of random numbers based on the names of the electoral lists of the population of the district. Initially, the information received was verified at the Tyumen Regional Address Bureau. The samples consisted of 1 thousand persons aged 25-64, 250 persons in each age decade of life. The criteria for enrollment in the population sample were females aged 25-64 years registered and living in the Central Administrative District of Tyumen. The criteria for withdrawal from the population were refugees, students, soldiers and prisoners, which was established from the words of the subject; these data were not included in the analytical array. Each resident included in the population sample was invited to take part in a cardiac screening. Involvement of the population to participate in the screening in the absence of a response to the first invitation was carried out by sending three reminder letters with an interval of 7-10 days or by an attempt to telephone or personal contact with potential participants.

The response on screening in 1996 was 81,3%, on screening in 2016 — 70,3%.

The prevalence of tobacco smoking was determined on cardiac screenings using a questionnaire tested within Cooperative Study on Multifactorial Prevention of Coronary Artery Disease. The questionnaire was developed at the Research Institute of Preventive Cardiology of the USSR Academy of Medical Sciences (currently, the Federal State Budgetary Institution "National Medical Research Center of Preventive Medicine" of the Ministry of Health of the Russian Federation) on the basis of adapted international methods. According to the questionnaire, the subjects who smoked at least one cigarette/day were considered to be regular smokers. In addition, individuals who smoked irregularly, never smoked and quit smoking were identified [10]. To determine the intensity of smoking, the first two positions (regular and irregular smokers) were considered together as "smokers" (Table 1). Further, the category of smokers was ranked according to age groups and depending on the number of cigarettes smoked/day. Women were considered to be heavy smokers if they smoked >10 cigarettes/day, according to this parameter, the category "smokers" was divided into smokers with low and high smoking intensity [5]. In accordance with the age classification adopted by the World Health Organization in 2015, two age groups were included in the analysis for this study — young age (25-44 years) and middle age (45-64 years) [11].

The research was carried out in accordance with the principles of the Declaration of Helsinki. The study protocol was approved by the local Ethics Committee. Written informed consent was obtained from all participants prior to enrollment.

For the statistical processing of the study results, the program IBM STATISTICS 21.0 was used. Using the data of the census of the population of the Russian Federation with the age structure of the Russian urban population, the results of the study were standardized by age. Results for categorical variables are presented as fractions (in %). When assessing the statistical significance between the sample fractions of the population in the two groups, the Pearson's chi-squared test (χ^2) with Yates' correction for continuity and Fisher's exact test were used. In the case of comparing three or more groups, the analysis of contingency tables was initially used, according to the criterion of "maximum likelihood chi-square" (ML Chi-square), to establish statistically significant differences between the groups, followed by paired comparison of the groups. For the critical level of significance when testing statistical hypotheses, $p<0,05$ was taken based on the number of degrees of freedom. When paired comparisons in four or more independent groups, to exclude the problem of multiple comparisons, i.e., to eliminate the error of the first kind, the Bonferroni correction was applied. The essence of the Bonferroni correction was to recalculate the significance level p for multiple paired comparisons using the formula p_0/n, where p_0 is the initially specified level of statistical significance (0,05), n is the number of paired comparisons.

Results

In accordance with the data in Table 1, the age-standardized indicator (SI) of the prevalence of tobacco smoking among women in the Central Administrative District of Tyumen was 23,1% and 31,2%, respectively,

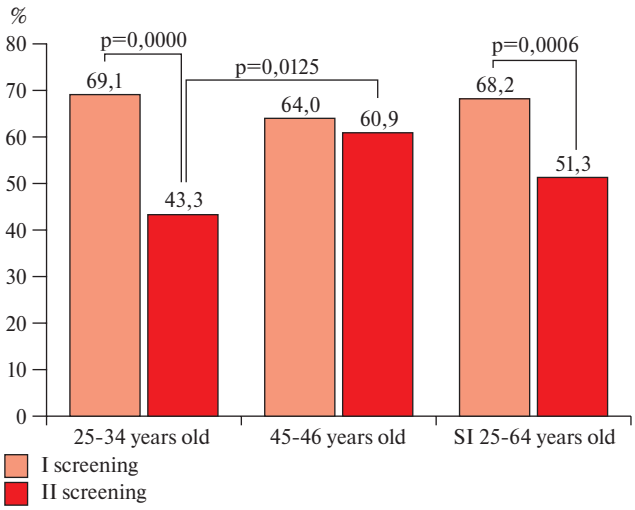

Figure 1 Dynamics of low intensity of tobacco smoking among women of the Tyumen population for the period 1996-2016, %.

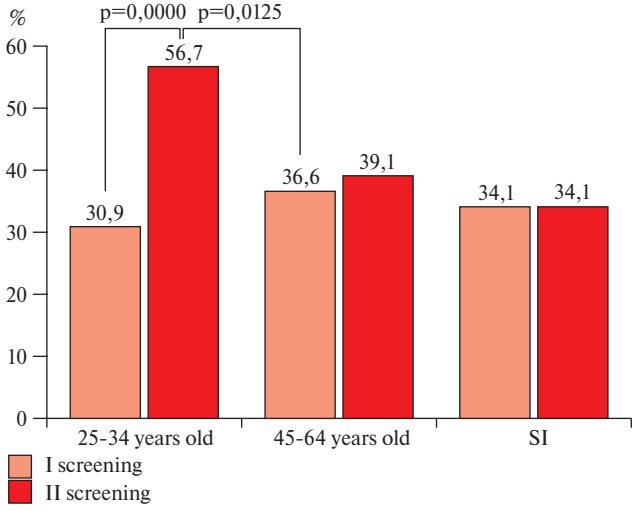

Figure 2 Dynamics of high intensity of tobacco smoking among women of the Tyumen population for the period 1996-2016, %.

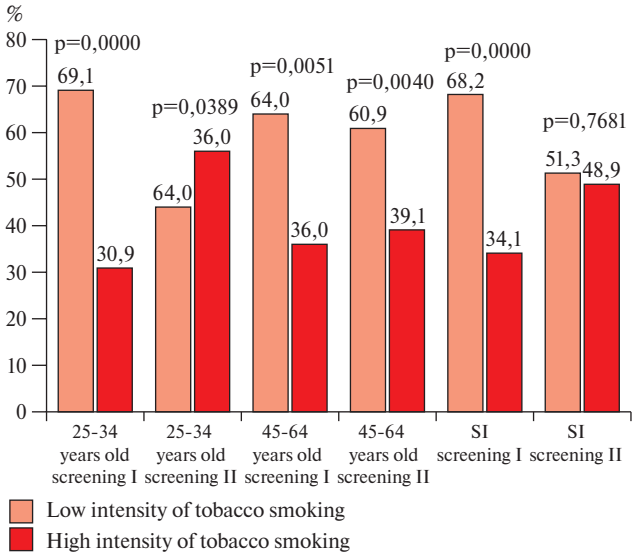

Figure 3 Dynamics of the intensity of tobacco smoking among women of the Tyumen population according to the data of the 1st and 2nd screenings, %.

according to the data of the first and second cardiac screening, the upward trend in the indicator at the second screening was statistically significant (p=0,0036). At the same time, a statistically significant increase in the prevalence of tobacco smoking over 20 years took place only among middle-aged women — 12,1 vs 23,3% (p=0,0000), among young women the prevalence of tobacco smoking remained almost stable — 34,0 vs 36,5% (p=0,4862) (Table 1).

Statistically significant differences in the prevalence of tobacco smoking between the categories of young and middle age were established according to the results of both the first — 34,0 vs 12,1% (p=0,0000), and the second cardiac screening — 36,5 vs 23,3% (p=0,0001), with higher indicators among young women (Table 1).

The SI of low intensity of tobacco smoking among women in the Central Administrative District of Tyumen showed a statistically significant tendency to decrease, and amounted to 68,2 and 51,3% according to the data of the first and second cardiac screening, respectively (p=0,0006). The twenty-year dynamics of a decrease in the low intensity of tobacco smoking in the Tyumen population was determined by the negative dynamics of a decrease in SI at a young age — 69,1 vs 43,3% (p=0,0000), while among middle-aged women the indicator remained almost stable — 64,0 vs 60,9% (p=0,7206) (Figure 1).

According to the results of the first screening, there were no significant differences between the categories of young and middle age in terms of low intensity of tobacco smoking — 69,1% vs 64,0% (p=0,5080). At the same time, according to the results of the second cardiac screening between these age categories, a statistically significant upward tendency of the indicator was determined — 43,3 vs 60,9% (p=0,0125) (Figure 1).

The SI of high intensity of tobacco smoking among women in the Central Administrative District of Tyumen was 34,1 and 49,8% according to the data of the first and second cardiac screening, respectively, a statistically significant increase in the indicator to the second screening was revealed (p=0,0006). Twenty-year dynamics towards the growth of high intensity of tobacco smoking in the Tyumen population was determined by a negative statistically significant tendency towards an increase in the indicator at a young age — from 30,9 to 56,7% (p=0,0000), while among middle-aged women the indicator remained practically stable — 36,0 vs 39,1% (p=0,7206) (Figure 2).

Statistically significant differences in the detection of high-intensity tobacco smoking in women of different age categories were established according to the results of the second cardiac screening with the highest indicators among young women — 56,7 vs 39,1% (p=0,0125). At the first screening, the indicator practically did not differ between age categories — 30,9 vs 36,0% (p=0,5080) (Figure 2).

An analysis of the study results of two independent samples showed that from the end of the last century to the 20s of this one, the priorities in relation to the intensity of tobacco smoking among women have changed significantly (Figure 3). So, according to the results of the first screening for the parameter of low intensity of tobacco smoking, residents of Tyumen demonstrated a statistically significant prevalence over the parameter of high intensity of both SI — 68,2 vs 34,1% (p=0,0000), and the corresponding indicators in the groups of young — 69,1 vs 30,9% (p=0,0000) and middle ages — 64,0 vs 36,0% (p=0,0051). By the second screening, SI in terms of the distribution of low and high intensity of tobacco smoking in Tyumen women became almost the same — 51,3 vs 49,8% (p=0,7681). In middle age, the tendency for the prevalence of low intensity of tobacco smoking over high one, inherent in the distribution of indicators at the first screening, remained — 60,9 vs 39,1% (p=0,0040). At the same time, in the group of 25-44 years old at the second screening, a statistically significant increase in high intensity of smoking over low intensity was revealed — 43,3 vs 56,7% (p=0,0389); in other words, among young women, the tendencies in the intensity of tobacco smoking were reversed.

Thus, over 20 years, the situation among women who smoke in the Tyumen population has changed dramatically. According to a study of two independent samples, with a general tendency towards an increase in the prevalence of tobacco smoking over a 20-year period, there was a change in priorities from low to high intensity of tobacco smoking, mainly at the expense of young women (Figure 3).

Discussion

In the mid-90s, sufficient attention was not paid to the problem of tobacco smoking, but today the situation has changed for the better. Among Russian women, the prevalence and intensity of smoking was traditionally low compared to European women [2], however, despite the measures taken by the government of the Russian Federation to limit tobacco smoking [8], an increase in the intensity of tobacco smoking among women was revealed in the Tyumen population over a 20-year observation period [12]. Measures such as pictorial warnings on tobacco products, banning smoking in public places, increasing the cost of tobacco products do not have a significant effect; moreover, in the Tyumen population, there was an increase in the prevalence of tobacco smoking among middle-aged women and, which is especially alarming, an increase in the intensity of tobacco smoking among young women.

According to the data of the global GATS (Global Adult Tobacco Survey), the prevalence of smoking among women from 2009 to 2016 decreased by 8%, at the same time, according to the data of Balanova YuA et al. [5], there is an increase in the prevalence and intensity of female smoking during the same observation period in the Russian Federation. An increase in the prevalence and intensity of tobacco smoking among women is noted in China, Indonesia, Bangladesh, as well as in Southern Europe [3, 13].

According to the 1996 baseline study, the prevalence and intensity of smoking among Tyumen women turned out to be quite high in comparison with the all-Russian data, but comparable with the data of the Siberian region, in particular, with the results of the Novosibirsk screening in 1995 [14, 15]. Analysis of the results on the Russian sample showed a significant increase in the prevalence and intensity of tobacco smoking from 1993 to 2013 [5]. Similar data were obtained from the monitoring of the Novosibirsk population carried out within the MONICA project (Monitoring trends and determinants in Cardiovascular disease), where in the age group 25-44 years from 1995 to 2014 there was a consistent increase in the prevalence and intensity of tobacco smoking in women [16].

The present results on the increase in the intensity of smoking among women seem to be justified, since the study was carried out on two independent samples during the period of the global socio-economic reforms in the Russian Federation [6]. The reforms carried out could not but have a significant impact on the change of priorities, mainly at a young age, including the Western way of life, where female tobacco smoking by the beginning of this century was much higher than in Russia [3, 11, 17]. Large-scale preventive programs in economically developed countries have significantly reduced these indicators, while in the Russian Federation, and in particular, at the level of the Siberian region, the preventive measures taken at the federal level were clearly insufficient.

The results obtained are comparable with the official data on the prevalence and dynamics of tobacco smoking in the Tyumen region, where, in accordance with the general tendencies in the Russian Federation, the situation among women turned out to be much worse than among men. Thus, since the beginning of the anti-tobacco campaign, the number of smokers in Tyumen has decreased by 10%, however, such positive changes were not observed among women, moreover, there is an increase in tobacco smoking among young women. With regard to the intensity of tobacco smoking, sociological studies in Tyumen have been carried out since 2014 without ranking by sex and age, however, in general, for the adult population during this period, there is a decrease in its intensity [18]. Consequently, the data of official statistics do not allow us to judge the vector of movement of the epidemiological situation in relation to the intensity of tobacco smoking among women in Tyumen for the period under study, while the results of the presented study, conducted on two independent samples, can serve as a scientific basis

for effective planning of a program for the primary prevention of CVD in the region.

Thus, within the framework of significant large-scale events at the federal level, it is necessary to direct efforts to reduce the intensity of tobacco smoking among women in medium-urbanized Siberian cities, paying special attention to the category of young age.

Conclusion

According to the results of a study of two independent samples of the Central Administrative District of Tyumen, a negative 20-year dynamics of growth in the intensity of tobacco smoking in the population was revealed due to the category of young women. In young women of the Tyumen population over a 20-year period, with a stable prevalence of tobacco smoking, a redistribution of priorities from low to high intensity of tobacco smoking was established — the prevalence of high-intensity smokers over low-intensity smokers at the second screening, while the situation was reversed at the first screening. In middle-aged women of the Tyumen population over a 20-year period, with a tendency to an increase in the prevalence of tobacco smoking at the first and second screenings, the prevalence of smokers with low intensity over smokers with high intensity remains.

Relationships and Activities: none.

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